



# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

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| Applicant's or agent's file reference<br>WO 21.0899  | <b>FOR FURTHER ACTION</b><br>See Form PCT/PEA/416        |  |
| International application No.<br>PCT/EP2004/007486   | International filing date (day/month/year)<br>07.07.2004 | Priority date (day/month/year)<br>10.07.2003   |
| International Patent Classification (IPC) or national classification and IPC<br>G01V3/20, G01V3/38   |  |  |
| Applicant<br>SERVICES PETROLIERS SCHLUMBERGER et al.   |  |  |
| <p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> sent to the applicant and to the International Bureau a total of sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> |  |  |
| <p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>   |  |  |
| Date of submission of the demand<br><br>09.02.2005   | Date of completion of this report<br><br>08.04.2005      |  |
| Name and mailing address of the International preliminary examining authority:<br> European Patent Office<br>D-80298 Munich<br>Tel. +49 89 2399 - 0 Tx: 523656 epmu d<br>Fax: +49 89 2399 - 4465  |  | Authorized Officer<br><br>Schneiderbauer, K<br><br>Telephone No. +49 89 2399-7613<br> |

10/563900

IAP20 Rec'd PCT/PTO 09 JAN 2006

International application No.  
PCT/EP2004/007486INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**Box No. I Basis of the report**

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
  - ☐ publication of the international application (under Rule 12.4)
  - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

**Description, Pages**

1-16 as originally filed

**Claims, Numbers**

1-25 as originally filed

**Drawings, Sheets**

1/6-6/6 as originally filed.

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing (*specify*):
  - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing (*specify*):
  - ☐ any table(s) related to sequence listing (*specify*):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

|                               |             |      |
|-------------------------------|-------------|------|
| Novelty (N)                   | Yes: Claims | 1-25 |
|                               | No: Claims  |      |
| Inventive step (IS)           | Yes: Claims | 1-25 |
|                               | No: Claims  |      |
| Industrial applicability (IA) | Yes: Claims | 1-25 |
|                               | No: Claims  |      |

2. Citations and explanations (Rule 70.7):

**see separate sheet**

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**1.) Reference** is made to the following documents:

- D1: WO 00/04405 A (SCHLUMBERGER HOLDINGS; SCHLUMBERGER CA LTD ; SCHLUMBERGER SERVICES PET) 27 January 2000 (2000-01-27)
- D2: US-A-5 502 686 (DORY EFRAIM ET AL) 26 March 1996 (1996-03-26)
- D3: EP-A-0 426 564 (SCHLUMBERGER HOLDINGS ; SCHLUMBERGER SERVICES PETROL (FR); SCHLUMBERGE) 8 May 1991 (1991-05-08)
- D4: US 2002/153896 A1 (JEWELL ANDREW DAVID ET AL) 24 October 2002 (2002-10-24)

**2.) Technical field:** borehole resistivity logging

**3.) Novelty (Art.33(1),(2) PCT) and inventive step (Art.33(1),(3) PCT) of the independent claims 1 (apparatus) and 13 (method):**

The subject-matters of claims 1 (apparatus) and 13 (method) are new over D1 which is considered to be the closest prior art document.

D1 discloses a method for measuring the voltage drop in two directions and calculating a current vector which is perpendicular to the bed boundaries (D1; description: page 13; 1st and 2nd parag.). To this purpose the measurement electrodes are arranged in several rows (embodiment with reference to fig. 12).

The subject-matters of claims 1 and 13 differ from D1 in that vertical and horizontal components are deduced from the measurements in two rows with horizontal offset. Vertical and horizontal components are summed in order to provide the total electric field. This provides the advantage of a better vertical resolution.

D1 is also not suitable for conducting such measurements because the method disclosed in D1 needs at least three horizontal rows, two of which are horizontally offset from each other.

Consequently, such a method cannot be found in any of the documents D1 through D4 from the ISR. The subject-matters of claims 1 and 13 are new and inventive.

**4.) Dependent claims:**

Claims 2 - 12 are dependent on claim 1 and claims 14 -25 are dependent on claim 13 and do as such also meet the requirements of the PCT with respect to novelty and inventive

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step.

**5.) Industrial applicability (Art.33(1),(4) PCT):**

Beyond any doubt the invention, as defined in claims 1 - 25, is industrially applicable.